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1. (canceled)

2. (currently amended) ~~The method of claim 1~~ A method to form an air gap interconnect structure comprising:

forming a multi-layer interconnect adjacent a substrate layer, the interconnect comprising conductive layers positioned in at least two conductive vertical series, the conductive vertical series isolated from each other by sacrificial dielectric material;

forming a protective layer adjacent the interconnect;

patterning the protective layer to expose portions of the sacrificial dielectric material;

decomposing portions of the sacrificial dielectric material to form a sacrificial dielectric decomposition product;

removing portions of the sacrificial dielectric decomposition product to form air gaps between the conductive layers; and

wherein forming a multi-layer interconnect comprises;

forming a first layer of sacrificial dielectric material, forming trenches in the first layer, and filling the trenches with conductive material to form at least two conductive layers isolated from each other by sacrificial dielectric material; and

forming a second layer of sacrificial dielectric material adjacent the at least two conductive layers and first layer, forming trenches in the second

layer in substantial vertical alignment with the trenches of the first layer, and filling the trenches with conductive material to form at least two additional conductive layers isolated from each other by sacrificial dielectric material.

3. (canceled)

4. (previously presented) The method of claim 2 wherein decomposing comprises decomposing substantially all of the sacrificial dielectric material between each of the vertical series at approximately the same time.

5. (original) The method of claim 4 wherein removing comprises removing substantially all of the sacrificial dielectric material between each of the vertical series.

6. (currently amended) The method of claim [[1]] 31 wherein decomposing comprises introducing a chemical agent comprising hydrofluoric acid.

7. (currently amended) The method of claim [[1]] 31 wherein removing comprises introducing water.

8. (currently amended) The method of claim [[1]] 31 wherein removing comprises introducing a carrier plasma.

9. (currently amended) The method of claim [[1]] 29 wherein the conductive layers comprise copper.

10. (currently amended) The method of claim [[1]] 29 wherein the first and second layers of sacrificial dielectric material comprise comprises a material selected from the group consisting of silicon dioxide, silicon oxynitride, and silicon oxyfluoride.

11. (currently amended) The method of claim [[1]] 30 wherein the protective layer comprises silicon carbide.

Cancelled 12

13. (previously presented) The method of claim 12 further comprising forming, above air gaps between the conductive layers, a first capping layer to contact the vertical support structures and surfaces of the most highly positioned conductive layers within each conductive vertical series or the protective layer on each conductive vertical series.

14. (original) The method of claim 13 further comprising forming a second capping layer adjacent the first capping layer.

15. (original) The method of claim 14 further comprising forming a third capping layer adjacent the second capping layer.

16. (original) The method of claim 15 further comprising forming a contact structure through the protective layer and first, second, and third capping layers to contact an underlying conductive layer.

17. (original) The method of claim 13 wherein the first capping layer comprises polyimide or a benzocyclobutene-based polymer.

18. (original) The method of claim 14 wherein the second capping layer comprises a material selected from the group consisting of silicon dioxide, silicon nitride, and silicon oxynitride.

19. (original) The method of claim 15 wherein the third capping layer comprises polyimide or a benzocyclobutene-based polymer.

20. (previously presented) The method of claim 16 wherein the contact structure comprises a metallic C4 structure.

21. (canceled)

22. (currently amended) An air gap interconnect structure comprising:

a. a substrate layer;

b. at least two conductive vertical series adjacent the substrate layer, each conductive vertical series comprising a plurality of conductive layers, wherein the conductive vertical series are isolated from each other by air gaps defined by side walls of the conductive vertical series;

c. vertical support structures peripheral to the conductive vertical series and isolated from the conductive vertical series by air gaps wherein none of the peripheral vertical support structures are between the at least two conductive vertical series; and

d. a capping layer adjacent to and above upper surfaces of the vertical support structures and the conductive vertical series.

23. (original) The structure of claim 22 wherein each conductive vertical series comprises between about 2 and about 6 conductive layers.

24. (original) The structure of claim 22 wherein the vertical support structures peripheral to the conductive vertical series protrude slightly more from the plane of the substrate

24. (original) The structure of claim 22 wherein the vertical support structures peripheral to the conductive vertical series protrude slightly more from the plane of the substrate layer than the uppermost conductive layer in the conductive vertical series.

25. (original) The structure of claim 22 further comprising a contact structure extending through the capping layer to contact an underlying conductive layer of a conductive vertical series.

Cancelled claims 26-27

28. (previously presented) An air gap interconnect structure comprising:

a substrate layer;

a first conductive vertical series adjacent the substrate layer having a plurality of conductive layers, and having a first side wall and a second side wall, each side wall extending substantially perpendicularly from the substrate layer;

a second conductive vertical series adjacent the substrate layer having a plurality of conductive layers, and having a first side wall and a second side wall, each side wall extending substantially perpendicularly from the substrate layer;

layers of silicon nitride on each of the first and second side walls of the first conductive vertical series and the first and second side walls of the second conductive vertical series; and

at least one peripheral vertical support structure, wherein no peripheral vertical support structure is between the first and second conductive vertical series.

29. (new) A method to form an air gap interconnect structure comprising:

forming a first layer of sacrificial dielectric material, forming trenches in the first layer, and filling the trenches with conductive material to form at least two conductive layers isolated from each other by remaining portions of the first layer of sacrificial dielectric material;

forming a second layer of sacrificial dielectric material adjacent the at least two conductive layers and the remaining portions of the first layer of sacrificial dielectric material, forming trenches in the second layer in substantial vertical alignment with the trenches of the first layer, and filling the trenches with conductive material to form at least two additional conductive layers isolated from each other by remaining portions of the second layer of sacrificial dielectric material; and

removing, after forming the first and second layers, at least some of the remaining portions of the first layer of sacrificial dielectric material and at least some of the remaining portions of the second layer of sacrificial dielectric material to form air gaps between the conductive layers.

30. (new) The method of claim 29, further comprising:

forming a protective layer adjacent the at least two additional conductive layers; and

patterning the protective layer to expose portions of the second layer of sacrificial dielectric material.

31. (new) The method of claim 29, wherein removing at least some of the remaining portions of the first and second layers of sacrificial dielectric material comprises:

decomposing portions of the sacrificial dielectric material to form a sacrificial dielectric decomposition product; and

removing portions of the sacrificial dielectric decomposition product to form air gaps between the conductive layers.